

## Claims

We claim:

- 5           1.       A method for configuring a graphical user interface (GUI) element to publish or subscribe to a data target or data source, respectively, the method comprising:
- displaying the GUI element on a display;
- receiving user input specifying at least one of a data source or data target with which to associate the GUI element;
- 10           in response to said receiving user input, automatically configuring the GUI element to perform at least one of: 1) receiving and displaying data from the specified data source; and/or 2) publishing data associated with the GUI element to the specified data target.
- 15           2.       The method of claim 1, wherein the GUI element is automatically configured without user programming.
3.       The method of claim 1, wherein the GUI element is automatically configured without user input specifying source code for this operation
- 20           4.       The method of claim 1,
- wherein said receiving user input specifying at least one of the data source or data target comprises receiving user input via a user interface dialog box.
- 25           5.       The method of claim 1, further comprising:
- the GUI element performing one or more of: 1) receiving and displaying data from the specified data source; or 2) publishing data associated with the GUI element to the specified data target, wherein said performing is performed after said automatically configuring.

6. The method of claim 1,

wherein the method executes on a first computer;

wherein the at least one of the data source or data target is comprised in a second  
5 computer remotely located from the first computer, wherein the first computer is operable  
to connect to the second computer over a network;

wherein said automatically configuring the GUI element comprises automatically  
configuring the GUI element to connect to the second computer and perform at least one  
of: 1) receiving and displaying data from the specified data source; and/or 2) publishing  
10 data associated with the GUI element to the specified data target.

7. The method of claim 1, wherein the GUI element is associated with a first  
computer program;

wherein said displaying the GUI element comprises including the GUI element in  
15 a user interface associated with the first computer program;

wherein said user input specifying at least one of a data source or data target is  
received during development of the first computer program.

8. The method of claim 7, wherein, during execution of the first computer  
20 program, the GUI element is operable to perform at least one of: 1) receiving and  
displaying data from the specified data source; and/or 2) publishing data associated with  
the GUI element to the specified data target.

9. The method of claim 7, further comprising:

25 executing the first computer program after said automatically configuring,  
wherein said executing the first computer program includes the GUI element performing  
one or more of: 1) receiving and displaying data from the specified data source; or 2)  
publishing data associated with the GUI element to the specified data target.

10. The method of claim 7,  
wherein the first computer program is a graphical program.

11. The method of claim 1, wherein the at least one of the data source or data  
5 target is one from the group consisting of:  
an HTTP server;  
an FTP server;  
an OPC server;  
an SNMP server;  
10 a DataSocket server; and  
a file.

12. The method of claim 1,  
wherein said user input specifies a first data source with which to associate the  
15 GUI element;  
wherein said automatically configuring comprises automatically configuring the  
GUI element to receive and display data from the first data source.

13. The method of claim 12,  
20 wherein the first data source is a remote data source associated with a remote  
computer;  
wherein said automatically configuring the GUI element comprises automatically  
configuring the GUI element to connect to the remote data source and receive and display  
data from the remote data source during program execution.

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14. The method of claim 13, further comprising:  
executing a computer program operable to publish live data to the remote data  
source;

wherein the GUI element is operable to display the live data published by the computer program.

15. The method of claim 1,  
5 wherein said user input specifies a first data target with which to associate the GUI element;

wherein said automatically configuring comprises automatically configuring the GUI element to publish data associated with the GUI element to the first data target.

10 16. The method of claim 15,  
wherein the first data target is a remote data target associated with a remote computer;

wherein said automatically configuring the GUI element comprises automatically configuring the GUI element to connect to the remote data target and publish data  
15 associated with the GUI element to the remote data target.

17. The method of claim 16, further comprising:  
executing a computer program operable to receive the data from the remote data target;  
20 wherein the computer program is operable to display the data.

18. The method of claim 1,  
wherein said user input specifies both a data source and a data target with which to associate the GUI element;  
25 wherein said automatically configuring comprises automatically configuring the GUI element to: 1) receive and display data from the specified data source; and 2) publish data associated with the GUI element to the specified data target.

19. The method of claim 18, wherein the specified data source is the same as the specified data target.

20. The method of claim 1, wherein the data is live data.

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21. The method of claim 20,  
wherein the data comprises measurement data.

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22. A method for configuring a graphical user interface (GUI) element to display data, the method comprising:

displaying the GUI element on a display;

receiving user input specifying a data source with which to associate the GUI  
15 element;

in response to said receiving user input, automatically configuring the GUI  
element to receive and indicate data from the specified data source.

23. The method of claim 22, wherein the GUI element is automatically  
20 configured to receive and indicate data from the specified data source without user  
programming.

24. The method of claim 22, wherein the GUI element is automatically  
configured to receive and indicate data from the specified data source without user input  
25 specifying source code for this operation.

25. The method of claim 22,  
wherein said indicating the data comprises displaying the data.

26. The method of claim 22, wherein the GUI element is associated with a first computer program;

wherein said displaying the GUI element comprises including the GUI element in a user interface associated with the first computer program;

5 wherein said user input specifying the data source is received during development of the first computer program.

27. The method of claim 26, wherein said receiving user input specifying the data source does not include receiving user input specifying source code for the first  
10 computer program.

28. A method for configuring a graphical user interface (GUI) element to  
15 publish data, the method comprising:

displaying the GUI element on a display;

receiving user input specifying a data target with which to associate the GUI element;

in response to said receiving user input, automatically configuring the GUI  
20 element to publish data associated with the GUI element to the specified data target.

29. The method of claim 28, wherein the GUI element is automatically configured to publish data to the specified data target without user programming.

25 30. The method of claim 28, wherein the GUI element is automatically configured to publish data to the specified data target without user input specifying source code for this operation

31. The method of claim 28, wherein the GUI element is associated with a first computer program;

wherein said displaying the GUI element comprises including the GUI element in a user interface associated with the first computer program;

5 wherein said user input specifying the data target is received during development of the first computer program.

32. The method of claim 31, wherein said receiving user input specifying the data target does not include receiving user input specifying source code for the first  
10 computer program.

33. A method for configuring a first computer program to display data, the  
15 method comprising:

displaying a graphical user interface (GUI) element associated with the first computer program in response to user input received during development of the first computer program;

20 receiving user input during development of the first computer program specifying a data source with which to associate the GUI element;

automatically configuring the first computer program to receive data from the specified data source and display the data in the GUI element during program execution, in response to the user input specifying the data source.

25 34. The method of claim 33,  
wherein said receiving user input specifying the data source does not include receiving user input specifying source code for the first computer program.

35. The method of claim 33, further comprising:

executing the first computer program;

wherein the first computer program is operable to receive data from the specified data source and display the data in the GUI element during said executing the first computer program.

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36. The method of claim 33,  
wherein the first computer program is a graphical program.

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37. The method of claim 33,  
wherein the method executes on a first computer;

wherein the data source is a remote data source associated with a second computer remotely located from the first computer, wherein the first computer is operable to connect to the second computer over a network;

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wherein said configuring the first computer program comprises configuring the first computer program to connect to the remote data source and receive and display data from the remote data source during program execution.

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38. The method of claim 37, further comprising:  
creating a second computer program operable to publish live data to the remote data source;

wherein the first computer program is operable to display the live data published by the second computer program in the GUI element.

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39. The method of claim 33,  
wherein the data source is a server program.

40. The method of claim 33, further comprising:

receiving user input during development of the first computer program specifying a data target with which to associate the GUI element, wherein said receiving user input



specifying the data target does not include receiving user input specifying source code for the first computer program;

in response to the user input specifying the data target, configuring the first computer program to receive user input changing data associated with the GUI element  
5 and publish the changed data to the specified data target during program execution.

41. The method of claim 40,  
wherein the data target is the same as the data source.

10 42. The method of claim 33, wherein the data source is specified by a uniform resource locator (URL).

15 43. A method for configuring a first computer program to publish data, the method comprising:

displaying a graphical user interface (GUI) element associated with the first computer program in response to user input received during development of the first computer program;

20 receiving user input during development of the first computer program specifying a data target with which to associate the GUI element;

automatically configuring the first computer program to publish data associated with the GUI element to the specified data target during program execution, in response to the user input specifying the data target.

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44. The method of claim 43,  
wherein said receiving user input specifying the data target does not include receiving user input specifying source code for the first computer program.

45. The method of claim 43,  
wherein the data published by the first computer program comprises user input data received by the GUI element during program execution.

5 46. The method of claim 43,  
wherein the data published by the first computer program comprises data programmatically associated with the GUI element during program execution.

47. The method of claim 43, further comprising:  
10 executing the first computer program;  
wherein the first computer program is operable to publish data to the specified data target during said executing the first computer program.

48. The method of claim 43,  
15 wherein the first computer program is a graphical program.

49. The method of claim 43,  
wherein the method executes on a first computer;  
wherein the data target is a remote data target associated with a second computer  
20 remotely located from the first computer, wherein the first computer is operable to connect to the second computer over a network;

wherein said configuring the first computer program comprises configuring the first computer program to connect to the remote data target and publish data to the remote data target during program execution.

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50. The method of claim 49, wherein the first computer program is operable to publish live data to the remote data target, the method further comprising:

creating a second computer program operable to receive the live data from the remote data target;

wherein the second computer program is operable to display the live data.

51. The method of claim 43, wherein the data target is a server program.

5 52. The method of claim 43, further comprising:

receiving user input during development of the first computer program specifying a data source with which to associate the GUI element, wherein said receiving user input specifying the data source does not include receiving user input specifying source code for the first computer program;

10 configuring the first computer program to receive data from the specified data source and display the data in the GUI element during program execution, in response to the user input specifying the data source.

15 53. The method of claim 52,  
wherein the data source is the same as the data target.

54. The method of claim 43, wherein the data target is specified by a uniform resource locator (URL).

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55. A method for configuring a graphical user interface (GUI) element to publish and subscribe to data, the method comprising:

displaying the GUI element on a display;

25 receiving user input specifying a data source and target with which to associate the GUI element, wherein the data source and target are the same;

in response to said receiving user input, automatically configuring the GUI element to receive and display data from the specified data source and publish data to the specified data target.

56. A method for exchanging live data between a writer program and a reader  
5 program, the method comprising:

executing the writer program, wherein the writer program is operable to write live  
data to a server program;

executing the reader program, wherein the reader program includes a GUI element  
configured to subscribe to the data written to the server program;

10 wherein the GUI element is operable to receive the live data from the server  
program and indicate the live data to a user of the reader program;

wherein the reader program does not include user-specified source code for  
implementing said GUI element receiving the live data from the server program.

15 57. The method of claim 56,  
wherein said GUI element indicating the live data comprises the GUI element  
displaying the live data on a display screen.

58. The method of claim 56,  
20 wherein the writer program includes a GUI element configured to publish data to  
the server program;

wherein said writer program writing live data to the server program comprises the  
GUI element of the writer program publishing data to the server program.

25 59. The method of claim 56,  
wherein the live data comprises measurement data.

60. A method for enabling a graphical program to exchange data with a data source or target, the method comprising:

including a GUI element in the graphical program;

configuring the GUI element with a data connection to the data source or target;

5 wherein said configuring the GUI element does not include specifying source code for the graphical program.

10 61. A method for enabling multiple reader programs to display data generated by a writer program, the method comprising:

creating a writer program operable to publish data to a server;

creating a reader program having a GUI element configured to receive the data published to the server and display the data, wherein said creating the reader program  
15 comprises automatically configuring the GUI element to receive the data published to the server and display the data;

executing the writer program;

executing the reader program on a plurality of computers, wherein on each computer, the reader program is operable to:

20 receive the data published to the server;

display the data in the GUI element of the reader program.

25 62. A system for configuring a graphical user interface (GUI) element to publish or subscribe to a data target or data source, respectively, the system comprising:

a display device;

a processor;

a memory medium coupled to the processor, wherein the memory medium stores a first program;

wherein the processor is operable to execute the first program to:

display a GUI element on the display device;

5 receive user input specifying at least one of a data source or data target with which to associate the GUI element;

in response to said receiving user input, automatically configure the GUI element to perform at least one of: 1) receive and display data from the specified data source; and/or 2) publish data associated with the GUI element to the specified data target.  
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63. The system of claim 62, wherein the GUI element is automatically configured without user programming.

15 64. The system of claim 62, wherein the processor and memory are comprised in a first computer system, the system further comprising:

a second computer system coupled to the first computer system via a network;

wherein the at least one of the data source or data target is comprised in the second computer system;

20 wherein the processor is operable to execute the first program to automatically configure the GUI element to connect to the second computer system and perform at least one of: 1) receive and display data from the specified data source; and/or 2) publish data associated with the GUI element to the specified data target.

25 65. The system of claim 62,

wherein the processor is operable to execute the first program to receive user input for creating a second program;

wherein the GUI element is associated with the second program;

wherein, in said displaying the GUI element, the processor is operable to include the GUI element in a user interface associated with the second program.

66. The system of claim 65,

5 wherein said receiving user input for creating the second program comprises receiving the user input specifying at least one of a data source or data target;

wherein said automatically configuring the GUI element comprises automatically configuring the GUI element to perform at least one of the following during execution of the second program: 1) receive and display data from the specified data source; and/or 2) publish data associated with the GUI element to the specified data target.

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67. A system for exchanging data, the system comprising:

15 a first computer system coupled to a second computer system via a network, wherein the first computer system and the second computer system each include a memory medium coupled to a processor;

a third computer system coupled to the second computer system via a network, wherein the third computer system includes a memory medium coupled to a processor;

20 a writer program stored in the memory of the first computer system;

a server program stored in the memory of the second computer system;

a reader program stored in the memory of the third computer system;

wherein the processor of the first computer system is operable to execute the writer program to write data to the server program;

25 wherein the processor of the third computer system is operable to execute the reader program to receive the data from the server program and display the data in a GUI element, wherein the reader program does not include user-specified source code for performing said receiving the data and displaying the data in the GUI element.

68. A memory medium for configuring a graphical user interface (GUI) element to publish or subscribe to a data target or data source, respectively, the memory  
5 medium comprising program instructions executable to:  
display the GUI element on a display;  
receive user input specifying at least one of a data source or data target with which  
to associate the GUI element;  
in response to said receiving user input, automatically configure the GUI element  
10 to perform at least one of: 1) receive and display data from the specified data source;  
and/or 2) publish data associated with the GUI element to the specified data target.

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